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ABSTRACT

This report focuses on transferable skills--those knowledge, attitudinal, and manual skills an employee brings to a job (or an employer expects an employee to bring) that provide that employee with occupational competence and mobility. The concept of "skill" and categories of skill are explored and defined. Chapter I discusses the concept of transferable skills. It looks at labor market issues and how they relate to the need for transferable skills. Developments in training practices are considered to see how they relate to the provision of transferable skills. Training issues are trade teachers, mobility and productivity, competence, and labor market. Chapter II looks at the two groups of skills that have been identified as enhancing job mobility: skills a student will require to complete a course of training and/or retraining and skills needed during a working life. The relationship between skills in the two groups and their usefulness in vocational curriculum design is discussed. Chapter III first considers three curriculum delivery methods relevant to delivery of transferable skills: competency-based delivery, individualized instruction, and modular instruction. Next, DACUM (Develop a Curriculum) is recommended as the most appropriate method for curriculum development for transferable skills. Finally, teacher participation is addressed. Chapter IV outlines the proposed strategy for instilling transferable skills into vocational curricula. A four-page list of references is provided. (YLB)

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TRANSFERABLE SKILLS IN TECHNICAL AND FURTHER EDUCATION

PETER THOMSON
JAN MURPHY

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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FOREWORD

This report has been prepared by the TAFE National Centre for Research and Development for the Victorian TAFE Board. It was funded by the Board as one of their Designated Grants Projects.

The work has been carried out by Peter Thomson from the National Centre and Jan Murphy of Preston College of TAFE. Their task was to investigate the concept of transferable skills as it applies to the development of vocational curricula.

As well as defining the concept and identifying the elements of the curriculum that go to make up the transferable skills component, they have also shown how transferable skills are related to current labour market issues such as technological change and unemployment.

Their work has led to a proposal which shows how transferable skills can be integrated into TAFE courses.

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Marie Wood and Lorraine Hobart typed the various drafts with their customary skill; Anne Bastian provided invaluable editorial assistance; and Giulia Reveruzzi prepared the final manuscript, including the diagrams, in an exemplary fashion.

TRANSFERABLE SKILLS IN TECHNICAL AND FURTHER EDUCATION - SUMMARY

1 This is a report about the skills needed for employment in the vocational area. Although the term 'transferable skills' appears throughout the report, it is important to appreciate that there is no such thing as a non-transferable skill.

2 A skill is a learned behaviour, therefore all skills must at least have the potential to be transferable.

3 By linking the learning of skills to employment issues the notion of transferability assumes a special importance and this is the way it has been dealt with throughout the report.

Transferable skills are those knowledge, attitudinal and manual skills that an employee brings to a job (or an employer expects an employee to bring) which provide that employee with occupational competence and mobility.

Examples of the three types of skill are:

- *the ability to multiply two, 3 digit numbers = knowledge skill*
- *acceptance of the need to arrive at work on time = attitudinal skill*
- *using a Phillip's head screwdriver = manual skill*

4 Transferable skills can be categorized into two groups:

- broad based skills (often called 'life skills') such as basic literacy, numeracy and an understanding of the world of work. These are transferable across many jobs;

- occupationally specific skills which are of relevance to a cluster of similar jobs, such as oxy-acetylene welding in the metal and construction trades.

5 Labour market trends have a considerable influence on TAFE training. Rising unemployment and technological change are closely related to the need for training in transferable skills.

6 Times of rising unemployment bring with them a range of related problems that affect skills training. The available jobs tend to go to the more highly educated and articulate job seekers. Transferable skills insofar as they contribute to a person being better educated and more articulate will clearly be useful to a job seeker, but, there is the overriding difficulty of convincing some employers to look for workers with the specific skills that are relevant to their needs.

7 The training for skills such as 'adaptability' and 'problem solving' that provide the workforce with greater mobility will be one way around some of the problems created by technological change. Greater mobility has links with greater productivity with the resulting benefits being experienced by both employers and employees.

8 The possession of certain skills will also make it easier for workers to leap the growing skills gap between skilled tradesperson and specialist technician.

9 Other labour market trends such as changes to the way work is organised have less relevance to transferable skills training. However, should there be a move by more employers towards a labour market strategy that encourages progression within an organization (rather than seeking to import skills from outside) the possession of skills which enhance internal mobility will be more highly prized than at present.

Another option available for developing occupational opportunity is that of increasing self-employment; here again transferable skills will be of considerable value.

10 Attitudinal skills are of fundamental importance in both obtaining and continuing in employment. However, only certain attitudes are amenable to inclusion in the training process. Attitudinal skills training which would involve TAFE teachers attempting to change the personalities or values of their students should be avoided. If such training is to be attempted at all, it needs to come from outside TAFE.

11 The rules and regulations of the workplace, and the shifts brought on by factors such as technological change, all influence how TAFE courses are developed and taught. There are real constraints on the responses that TAFE trainers can make to meet changing skill requirements since many of the workplace developments are beyond their control.

12 To handle properly the various labour market issues that arise, it will be essential to ensure that any implementation of transferable skills training has involvement and support from the four sectors (employers, unions, the industrial training authority and TAFE) at all stages from design to delivery. It is also reasonable to expect governments to take the lead in ensuring such cooperation occurs. Indeed, with the potential that exists for changes to industrial legislation, government involvement will be mandatory.

13 Pressures for changes in training methods are mounting particularly within the traditional apprenticeship system because of disenchantment with:

. the reliance on a time-serving method to judge 'satisfactory completion' of a training program;

. the inability of some employers to give apprentices the full range of experiences they need in order to be deemed proficient in the trade;

. the inflexibility of apprenticeship legislative requirements in such things as age restrictions, educational prerequisites, and terms and conditions.

14 Support is growing for a competency-based system of education and training involving the specification and demonstration of job-related skills. Competencies (which would include transferable skills) are carefully identified and subjected to verification by experts. The criteria for assessing each competency are also explicitly stated and made public. Students can then progress through the training program at their own pace with assessment taking place along the way.

15 Going hand in hand with competency-based training is the use of modules in instruction. While there is strong evidence of their effectiveness, their introduction needs to be well planned. Most important among the issues that need to be taken into account is the requirement that teachers need to be trained in the use of modular instruction. Teachers need to know how to deal with a situation in which different students are working on different modules. This is particularly true in workshops where a wide range of practical work may be going on at the same time.

16 Competency-based programs using individualized instruction in the form of modules have ramifications for training policies which intrude back into labour market issues. If a trainee is able to become fully qualified well within the normally allowed time, questions of terms and conditions of employment arise. It will be necessary to review the practices whereby employers encourage an artificially-long training period (as with some apprenticeships) to ensure they receive a return on their investment in training.

17 Any proposals to change the way TAFE teachers teach or what they teach will require thorough planning and extensive ongoing staff development work. This applies particularly to transferable skills training where there is already evidence of a lack of enthusiasm on the part of some teachers.

18 Educators and employers are largely in agreement that roughly the same set of transferable skills are needed by people whether they are required for completing a course of study or for working life in general.

19 A strategy for instilling transferable skills into vocational curricula is proposed. It requires:

- a competency-based approach;
- the use of individual progression;
- the use of modular instructional materials;
- sequencing in a way which starts with skills from the specialized parts of the curriculum then moves to the occupationally-specific transferable skills then to the basic transferable skills.

20 The resource implications for the strategy are considerable and outstandingly important among these will be the staff development needs of teachers whose task it will be to deliver transferable skills.

DEFINITIONS

Before embarking on a discussion of the concept of transferable skills it is necessary to make some reference to the often confusing range of terms involving 'skill' that are in the literature.

We will consider several adjectives used with the term 'skill' as well as the word 'skill' itself. The definition we have applied to *transferable skills* throughout this report is also given.

1 Skill

An initial comment needs to be made on the term 'skill'. Throughout the literature it is used in different ways with different meanings. Some writers have avoided the problem of defining skills by dropping the term altogether and referring instead to specific behaviours. Such a ploy was not possible for us, given the term's common currency in the vocational education literature. We have therefore adopted the simple definition of a *skill as* being *any learned behaviour*. This definition has enabled us to consider knowledge, attitudinal and manual skills as candidates for transferability. (We have chosen to use the terms 'knowledge', 'attitudinal' and 'manual' in preference to the conventional jargon of 'cognitive', 'affective' and 'psychomotor' in the belief that they will be better understood by the non-specialist reader.)

Examples of the different skills are:

the ability to multiply two, 3 digit numbers = knowledge skill

acceptance of the need to arrive at work on time = attitudinal skill

using a Phillip's head screwdriver = manual skill.

One problem that our definition of skill can bring about is that it could imply to some readers that there is a level of proficiency in the performance of a behaviour. In other words, not only can people use a Phillip's head screwdriver but they can use it well (whatever 'use it well' means). We have not used the term in this way, but it may have been so used by some of the authors we have quoted.

2 **Basic skills**

In Europe and Australia this term is commonly used to mean those skills that are needed for workers to succeed in the labour market; that is, fundamental abilities without which training/education/employment is almost impossible. Examples of these fundamental abilities are basic literacy and numeracy skills. This definition implies a lower level of ability than that required in some of the following definitions. That is to say, a basic skill implies the achievement of an acceptable standard rather than (as will be seen in the case of transferable skills) the optimization of a skill which will enable the holders to progress upwards or sideways in the labour market.

3 **Core skills**

These are skills which are seen to be necessary for all students and workers and form the basis on which more specialized strands of study or work are developed. Core skills are very similar to basic skills and the terms are used interchangeably by some authors.

4 **Common skills**

Schilling (1983) saw common skills as 'lying between "general skills" and "specific skills"'; that is, skills common to several occupations which once attained give students a better chance of matching themselves with the skill needs of the labour market.

Common skills are often referred to in terms which indicate a group of 'core' skills presented to students in different but related programs, to which the more specialized skills of the occupations are added at a later stage. Clearly there are links and considerable overlap between the notions of 'common', 'basic', 'core' and 'transferable'.

5 **Generic skills**

Generic skills are those job behaviours which are actively used in work performance, which are transferable from one job to another, and which are needed for promotion to supervisory status. By this definition, most communication, simple arithmetic and reasoning skills are highly generic, while advanced algebra and science skills are not (Employment and Immigration Canada, 1979). As will be seen from definition number 6, generic is almost synonymous with 'transferable', the difference being that under certain conditions 'advanced algebra and science skills' can qualify as transferable.

6 Generalizable/change/transferable/transfer skills

These four terms are often used interchangeably, the former two originating in the United States, the latter two being more European.

Research on basic skills and occupations suggests that transferable skills are critical to employability and occupational competence and that they are transferable because they have applicability to a broad range of occupations and jobs (Pratzner, 1978).

Transferable skills are the skills and abilities which individuals bring with them from job to job, and which apply in each job.

The wide applicability or transferability of skills is particularly important since many people change occupations several times and the labour market demands also change. Transferable skills are believed to be critical to the successful transfer of the more specific task-related skills. Having transferable skills however, will not guarantee, but should facilitate, occupational competence and adaptability (Pratzner, 1978).

Recently, the idea of skills which are basic, transferable and needed for success in vocational programs and occupations has been considered in terms of generalizable skills. Generalizable skills are seen by some American research workers as concerned with the transferability of cognitive, affective, and psychomotor abilities which are necessary for success across vocational programs and occupations (Greenan, 1982; 1983). Frequently, proficiency in the cognitive and affective areas may be a prerequisite to proficiency in vocational psychomotor skills. Thus, the concept of generalizable skills can provide a basis for identifying those skills and abilities necessary for success in vocational/technical programs and occupations (Greenan, 1982).

For 'generalizable' it is therefore possible to read 'transferable'. Similarly, the term 'change skill', meaning a skill which enables the individual who possesses it to be better able to change jobs, can also be considered as synonymous with 'transferable'.

For the purpose of this paper, the following definition of transferable skills will be used:

> *Transferable skills are those knowledge, attitudinal and manual skills that an employee brings to a job (or an employer expects an employee to bring) which provide that employee with occupational competence and mobility.*

7 'Non-transferable' skills

The simple definition of the term 'skill' as used in this report implies that all skills are transferable, in other words, there is no such thing as a non-transferable skill. However, the report does further define *transferable* skills as being tied to employability, therefore, only those skills that provide an employee with occupational competence and mobility in a particular job or cluster of jobs are dealt with.

CHAPTER I: THE CONCEPT OF TRANSFERABLE SKILLS

1.0 INTRODUCTION

Australia at Risk: an underskilled and vulnerable society, was the provocative title of a 1984 essay by Bill Ford, an expert in industrial relations issues at the University of New South Wales. Ford argues the need for organizations and governments to integrate their policies for skill formation with their technology, trade and industrial relations policies.

This report, which looks at one element of skill formation—the concept of transferable skills—endorses Ford's view and focuses on the role to be played by TAFE.

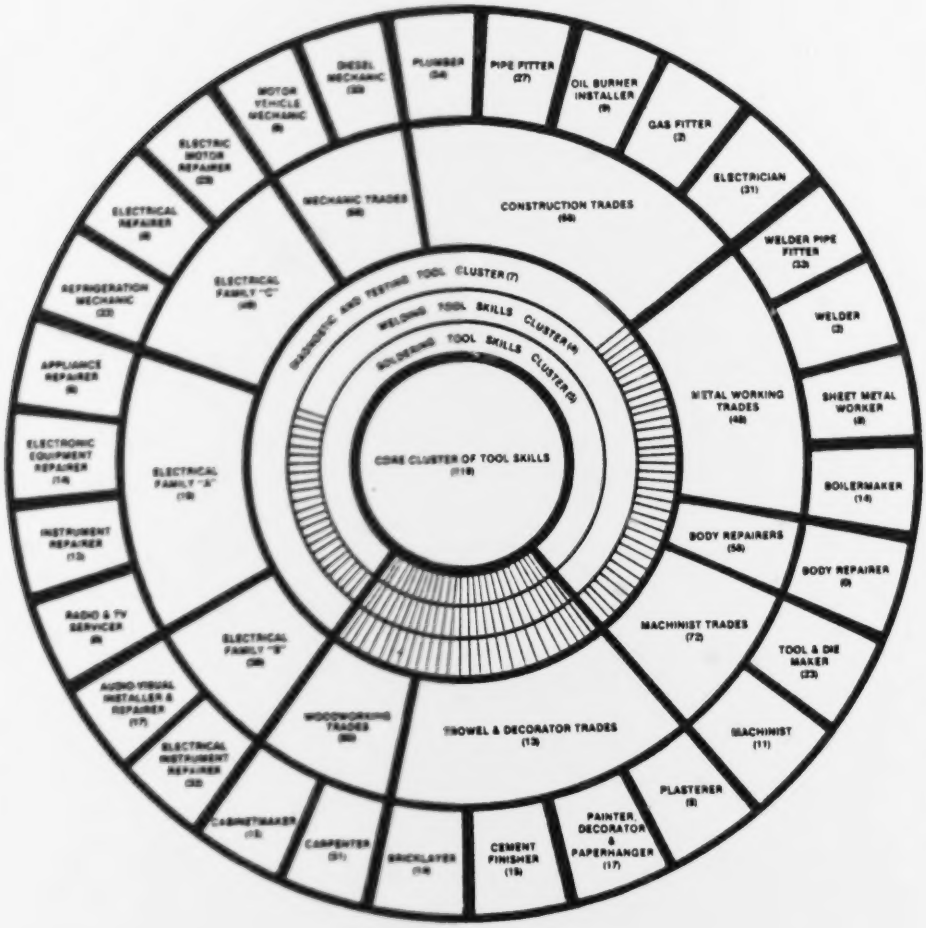
The impetus for this study initially came from recommendations in the Kirby Report (1985). The Kirby committee recognized the influence of technological change on the labour force and stressed the importance of transferable skills.

It is widely acknowledged that TAFE must cater for both the immediate vocational needs of students as well as giving them the necessary skills to adapt to changing work environments. The skills which enhance worker adaptation are given many names in the literature; for example, common, transferable, change, generic or generalizable skills.

Some pioneering work of the Occupational and Career Analysis and Development Branch of the Canadian Department of Employment and Immigration during the 1970s led to a number of publications on what their researchers termed 'generic skills'. Their definition of 'generic skills' bears a close similarity to what is termed 'transferable skills' in this paper. A major part of the Canadian work was based largely on a survey of the use of 588 trade tools in a total of 131 occupations. The survey revealed a core cluster of 116 tool skills which were common to all the trades surveyed and also recognised associations between the use of tools and families of occupations. The results are summarized in the diagram on p.10.

This work gave strength to the argument that much trade training could be generalized around cores of transferable skills that were relevant to a family of trade occupations rather than simply to one specific trade.

OCCUPATIONS AND TOOL SKILLS

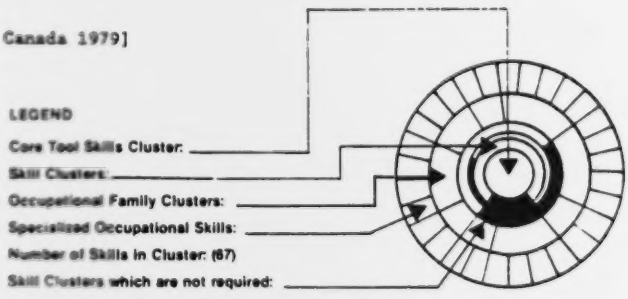


NOTE: This model identifies 3 skill clusters outside the core cluster of 116 tool skills namely:

- soldering (5 skills)
- welding (4 skills)
- diagnostic and testing (7 skills)

The unshaded part of these 3 clusters show the occupations to which these tool skills apply. For example, the soldering tool-skills which involve the use of 5 tools not listed here (soldering pencil, iron and torch, propane torch, oxy-propane torch, silver soldering tools) are common to all the occupations from Electrical Instrument Repairer to Machinist, reading in a clockwise direction.

[After Employment & Immigration Canada 1979]



For the purpose of this report 'transferable skills' are that body of knowledge, attitudinal and manual skills that a worker takes from job to job.

Previous studies such as the Canadian work have concentrated on analysing components of tasks required for an occupation then cross-matching those components to form two categories of skills. These two categories are broad-based skills (for example, the ability to understand and follow written instructions) and occupationally-specific skills (for example, the ability to perform a butt weld at a specified angle), which are then deemed to be 'transferable' within an occupational cluster.

The practice of using occupational analysis as a basis for curriculum design is discussed in more detail later in this report, however, at this point it is of interest to note that the major findings - Kawula & Smith (1975), Sjogren (1977), Greenan (1982), reinforce the view that there are two categories of transferable skills, namely:

. broad-based 'life skills' that have a relevance to many jobs and which include such things as literacy, numeracy, reasoning and interpersonal skills. These are transferable in varying degrees across the majority of occupations (see Greenan, 1983b, for a detailed analysis of the last 10 years research);

. occupationally-specific job skills which are of relevance to groups or clusters of similar occupations and are transferable between those occupations (see Hayes, 1981). An example would be oxy-acetylene welding in the metal and construction trades.

Originally it was assumed that these two strands of transferable skills could be studied separately, however, as the interactions between various aspects of education, training and employability became more clear, it was apparent that a different approach was needed.

Indeed, the distinction between the terms 'broad based' and 'occupationally specific' is at times very blurred. For example, numeracy is a broad-based transferable skill at some levels but not at others. When it involves multiplication and division of decimals, numeracy is generally broadly based, but, when it involves the use of trigonometry, it then becomes occupationally specific.

The international problem of youth unemployment has generated many training schemes, each hoping to maximise the participants' opportunities for entering the full-time workforce. Schemes such as those operating in Denmark, Finland and to a certain extent in the UK, use these courses to obtain entry level employment qualifications for the participants (OECD 1983). The curricula include broad-based skills, and core

occupational-specific skills, often locally designed. For example, the Technical Vocational Education Initiative (TVEI) in the UK specifies 'occupational training families' and provides some basic training in the occupational-specific transferable skills. It is intended by these courses that specialised vocational training and retraining throughout life will follow from the initial skills learned.

Of particular interest to this report were the reasons behind the emphasis, both overseas and in Australia, on training for broad-based transferable skills and the success or otherwise of their use in conjunction with occupationally-specific skills training for families of occupations.

Advocates for transferable skills training have drawn upon a wide range of labour market issues to support their position.

2.0 CURRENT LABOUR MARKET ISSUES

This section looks at labour market issues and how they relate to the need for transferable skills. The issues are:

- how to get a job in times of increased unemployment;
- responses to technological change;
- the growing skills gap between specialist and skilled manual worker;
- organisation of work;
- occupational opportunities and the size of the enterprise;
- increasing importance of attitudinal skills for employment.

2.1 How to get a job in times of increased unemployment

Due to the greater numbers of people competing for a diminishing number of available jobs, employment patterns already experienced overseas are now occurring in Australia (Jones, 1986).

The trend has been an overall decrease in the number of available apprenticeships and a decrease in the availability of full-time jobs. There have also been increases in part-time and casual jobs; increases in skilled manual (craft) jobs; increases in white-collar jobs and increases in less skilled jobs. At the same time, the average level of qualifications of entrants to 'skilled-manual', 'semi-skilled' and 'white-collar' occupations has risen (Freeland, 1985).

Violas (1982) has demonstrated that in the United States, entrants to the labour force are more advantaged by a general high school education than by a vocational school education. He found that it is the articulate, well-mannered, 'better educated' person who is selected in preference to others who possibly have more relevant job-specific skills for the position.

The reputation of secondary vocational students is not enhanced when they are compared with their general education contemporaries. Weber and Silvani-Lacey (1983) have shown that vocational students perform significantly less well than general secondary students (about one-half a standard deviation below) on standardized basic skills measures.

Violas theorizes that employers prefer a higher level education entrant because the student will be better able to adapt to new situations and training than a less formally trained person. These findings are similar to those from the Youth Training Scheme (YTS) in the UK and the Youth Guarantee Scheme in Australia (Holland, 1982; Industrial and Commercial Training, 1982; Weatherley, 1983). The schemes have found that, given a choice, employers will select a better qualified or better educated applicant over others even for a position which is essentially unskilled and with little prospects of advancement. This trend continues to occur despite the warnings from employers such as Phelan (1984) who notes:

> One of the difficulties we are finding at the present time with employment running the way it is in the 15 to 19 year age group, is that employers have been tending to prefer the Year 12 student to the Year 10 student who has been the traditional apprentice. That is counter productive, because the good Year 12 student is not going to stay in the tradespersons' ranks (p.67).

Two quotes from Stern (1977) in his investigation of policy options for combating unemployment in the US, clearly illustrate this unemployment dilemma.

> The basic human resource problem among adults in the United States is not a shortage of skilled individuals, but a shortage of jobs—skilled or unskilled. The problem is larger than our current economic difficulties. For the last half century, this Nation has not been able to provide jobs during peacetime for everyone able and willing to work (p.xxxiv).

> A substantial amount of research evidence in the subject suggests that vocational education overall is no better and no worse than other curriculums in creating labour market advantages for its graduates. The U.S. economy is characterised more by a shortage of jobs than a shortage of skills (p.16).

This undoubted shortage of jobs has not (as was hoped) been ameliorated by employment opportunities in the new 'sunrise' industries, in other words, 'high tech' has not led to high employment. Unfortunately, the evidence from the US and the UK (Watkins, 1986) indicates that although high technology will, of necessity, demand higher technological and scientific skills from some workers, the actual number of jobs available for such people will be small. (Other aspects of technological change are taken up in the next section.)

Times of rising unemployment bring with them a range of related problems that affect skills training. The available jobs tend to go to the more highly educated and articulate job seekers. The Year 12 graduate will be selected before the Year 11 graduate and the person who 'presents well' before the one who 'presents poorly'. Transferable skills, insofar as they contribute to being better educated and more articulate, will clearly be useful to a job seeker. However, one problem that needs to be addressed is that of educating the employers to look for workers with the specific skills that are relevant to their needs rather than simply choosing those with the best 'paper qualifications'.

2.2 Responses to technological change

There is some contention as to whether the new technologies are in fact creating a demand for new skills. As already noted above, high technology specialists are not needed in high numbers. Unfortunately therefore, many skilled workers are finding that they are displaced by technological change and they must either upgrade their skills by specialising (for example, automotive electricians are now specialising in automotive electronics in order to work on the computerised systems in modern cars) or find alternative employment.

The recent Times (UK) printing dispute presents another facet of the problem. Union efforts notwithstanding, there are only limited areas for redeployment of existing skills once technology replaces human labour as a cost-effective solution for management.

The current wave of technological change, based on the availability of the cheap computer, robotics and microprocessors will have its most significant impact on skilled jobs in industry. This impact will be felt in three ways:

1 the *process* of manufacturing will become less skill-intensive through the increasing use of computer-assisted design (CAD) and computer-assisted manufacture (CAM) techniques and robotics;

2 the *products* will change from self-regulating mechanical systems which depend on a precise match and interaction of their components for their efficient operation, to systems in which the control functions are carried out by machine-produced microchips without the need for human skills to produce the precise matching and interaction of components;

3 the *service* requirements of these new products will make fewer demands on skilled labour, because the main source of wear and failure will lie in the solid-state microelectronic systems which are cheaper to replace than to repair.

The consequences of these changes will be felt by the existing skilled workforce many of whom may become redundant or forced to take lower paid, lower status jobs. But, education and training systems will also be drastically affected as employers become loath to bear the brunt of the long-term training costs of traditional apprenticeships, and as they and the training institutions find they lack resources to provide training in the most up-to-date changes in technology. Ford (1984) noted the effect technological changes such as these have had on the workforce.

Ford also identifies another dimension of the problem with his comment that the importing of technology from countries with different attitudes to technology and skill formation to our own, must affect our own training systems and skills base; for example, the maintenance philosophies built in to imported PABX equipment is at odds with that already prevailing in this country.

Transferable skills such as 'adaptability' and 'problem solving' are clearly of value in the situations described above. Although in some ways far from the ideal solution, the training for skills that provide the workforce with greater mobility will be one way around some of the other problems created by technological change.

However, technological change also highlights a related issue—that of a growing 'skills gap'.

2.3 The growing skills gap between specialist and skilled manual worker

Overseas experience suggests that people with a middle level of skills in both the trades and professional occupations in Australia will experience a decline in job opportunities. The effect of this will be to create what has been called a 'skills gap' between the specialist skilled workers and the lesser skilled workers (often lower paid and unprotected by unions) who are expected to make up the bulk of employed people (Ford, 1984).

In this country, Fraser (1983) has also expressed concern regarding the declining demand for some skilled manual jobs. An example of the problem can be found in the sheetmetal trade where sophisticated CAD/CAM equipment controlled by a highly-skilled technician is making giant inroads into the work of the traditional sheetmetal worker.

The available avenues for increasing or adapting existing accredited skills to new technology are small and the traditional apprenticeship system is unable to adapt to teach for rapidly changing skills. Hunter (1984a) makes this point when he writes:

> Specialization within occupational and industrial categories has led to a situation in which it is now virtually impossible for a single employer to provide an apprentice with the broad range of work experiences required under existing State industrial training legislation (p.25).

Pead (1982) is another strong critic of the current training system (in his case he directs attention to the manufacturing industry). Pead believes manufacturing industry training is too broadly based and neglects the country's need for specialists to compete with overseas competence.

The Federal Minister for Science, Barry Jones, (1986) predicts that in the future:

> There will be far less correlation between specific vocational training and actual experience in the labour force (p.77).

One solution to the problem identified by the above writers has traditionally been the country's immigration policy. In the past Australia has been known to import migrants to cover any shortfall in skills required of its workers. However, in a time of rising unemployment, this policy can become increasingly unpopular with a large section of the electorate. An alternative is to update the existing skills base.

Pead (1982) and Fraser (1983) have studied Australian methods of updating skills in relation to the increasing demands of high technology and labour market changes. Both have made recommendations which stress that there will be areas in industry demanding specialised skills. These are areas in which Australia cannot afford to lag behind the rest of the world, yet, the current training systems are demonstrably ineffective in updating the necessary skills. As Ritchie (1984) of the National Training Council's Standing Committee on Training for Advanced Technology puts it:

> I see a number of problems and opportunities which need tackling. The first is whether we are willing to develop the training and education systems to keep up with the demands for new skills imposed by new technologies. Some will say that we can muddle through, as we have in the past. However, there is substantial evidence of skills shortages caused by new technologies and inadequate training responses e.g. systems analysts, electronic technicians. I am not suggesting that such problems are pervasive in all occupations or industries, but there are a number of areas where the supply of skills is inadequate as a result of rapid technological change.
>
> Furthermore, this is having a detrimental effect upon the competitiveness of these Australian industries and a loss of potential employment for Australian workers (p.1).

Whether the problem is updating skills to bridge the skills gap emerging for the present workforce or the groups like apprentices that are still in training, some hope can be offered by transferable skills. The possession of certain skills will obviously make it easier for workers to leap the skills gap, but, the research quoted above does draw attention to more fundamental problems in the system, such as the way both training and work are organised. These points are considered in the next section.

2.4 Organization of work

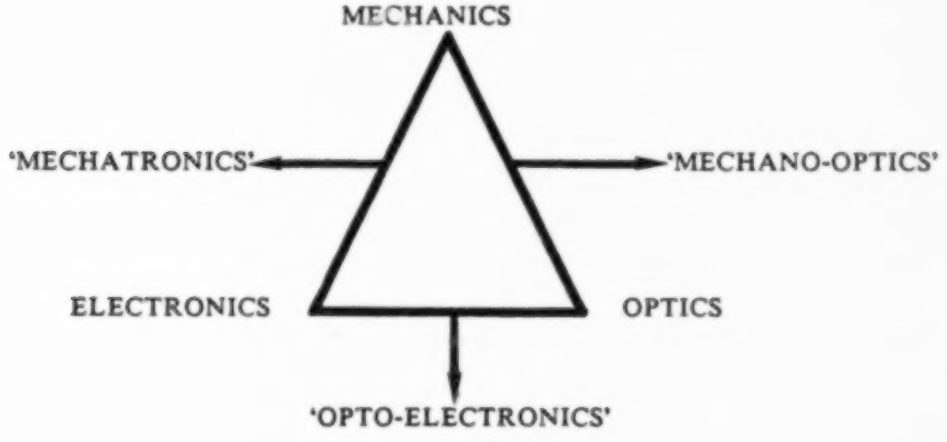
Employers have two broad strategies available to adapt to changes in their skill requirements. The first is an external labour market strategy which meets its skill needs by shedding labour with obsolete skills and hiring workers with skills in demand. The alternative is an internal labour market strategy which achieves changes in skill requirements through retraining, re-definition of occupations and the internal redeployment of redundant workers. Murphy (1986) has concluded from his study of the Australian situation that:

> . . . it appears that many Australian firms have provided little internal training because of their reliance on an external labour market strategy. This tendency has been supported by two additional factors. The first has been the relatively easy availability of migrant skilled labour . . . The second factor which helped the greater reliance of Australian firms on the external labour market strategy was the trade union movement's support for a youth-based apprenticeship system as a means of maintaining the external labour market value of a trade qualification and the inter-firm mobility of tradesmen (p.19).

The absence of a career path for most people in the trades is evidenced by the relatively flat lifetime earnings curve that is a characteristic of trade occupations. The present award system of job classifications tends to define jobs narrowly and to base pay on tasks performed. This in turn has inhibited the growth of new work categories, a point that is made strongly by Ford (1984).

> In the long run, demarcation disputes may confine people to such a narrow band of skills that they will be made redundant by technological change. The opportunity to develop a range of skills is therefore an important security for individuals and organizations in a period of continual change (p.61).

Ford has elsewhere challenged the traditional separations between technologies and suggests these are becoming blurred to create what he calls 'fusion technologies' (Hayes, 1986). For example, 'Mechatronics' is becoming a fusion between mechanics and electronics as shown here.



A most important part of these developments as Ford sees them is that the pressures to bring about the fusions are coming out of the workplace. On this basis he suggests that traditional demarcation issues are irrelevant and out of date.

There is also a discussion of this issue in the Kirby Report (1985) which arrived at a similar conclusion on the matter of new occupations while at the same time seeing changes in existing jobs as the major effect on the organization of work.

> The extension of technology has led to the appearance of a few new occupations but its main effects have been to transform existing occupations and to set up a series of consequences for other jobs that cannot readily be anticipated (p.127).

Transferable skills training can have little impact on problems that have their origins in the way work is organised. However, should there be a move by more employers towards an internal labour market strategy, the possession of skills which enhance mobility within an organization will be more highly prized than at present.

2.5 Occupational opportunities and size of the enterprise

The effects of current economic trends on employment opportunities are well known however, their ramifications in terms of the size of the enterprise are not so obvious.

In Australia, the bulk of employment occurs in small businesses (Mill, 1984). This situation exacerbates the problem in some trade areas when the economic climate can make it less profitable for a small company to employ trainees. In addition, small companies are less capable of providing trainees with the variety of on-the-job experience necessary for them to master the appropriate range of skills for them to be deemed competent in all facets of the job.

The opportunities for workers to gain wide experience in an occupation to enhance their future options are proportional to those opportunities being available in the labour market. Opportunities in the labour market are related in turn to capital investment, government tariffs, overseas competition, pricing structures and available technological and human resources. The situation in Australia at present is one of a shrinking economy, in which relatively little increase in productivity is occurring, both of which contribute to reduced occupational opportunities.

One option available for developing occupational opportunity is that of increasing self-employment; to that end the EEC recommended in 1983 that member countries:

> . . . implement training programmes enabling trainees to acquire a wide range of practical skills designed to facilitate their active adjustment to technological change, to improve their mobility and, where appropriate, to encourage them to become self-employed (p.28).

Thorogood (1985) in his research on the generation of employment found that greater success was to be had in strategies of micro-intervention in community employment rather than a macro-economic approach. In other words, he reported that more benefit was to be had in terms of employment generation on the small scale by support for small business initiatives, product development and support for existing skills. Thorogood also stressed the need to develop entrepreneurial skills to encourage local employment opportunities.

The EEC recommendation quoted above reads like a recipe for a transferable skills package, although the small scale entrepreneurial approach suggested by Thorogood does add a new perspective. The literature on entrepreneurial skills is not however of much assistance. Although claims are made that entrepreneurs can be trained, the claims are largely untested. Whether entrepreneurial skills (assuming, of course, we can define them) should find their way into transferable skills packages in something that cannot be decided at this time.

2.6 Increasing importance of attitudinal skills for employment

The literature tells us that employability in an environment of rapid change is largely dependent on attitudes such as self-confidence, adaptability and interpersonal skills, in addition to knowledge and manual ability. Surveys of employers in the US and UK have revealed that, with a greater choice of workers to select from, increasing emphasis will be placed on attitudinal traits and abilities when selecting for employment or promotion (Wiant, 1977; SCRE, 1977).

In a recent Australian investigation of customer service provision, Coopers & Lybrand W.D. Scott (1986) identified 10 core skills required by employers in the range of service industries surveyed. The majority of these skills were attitudinal, such as, courtesy, politeness, willingness, and friendliness.

However, Sjogren (1977) questions whether attitudinal skills like these can be instilled into trainees, and believes that if such training is attempted it would have to be conducted in an appropriate setting. That is, when teaching for transfer of these skills, an appropriate setting is vital.

This is now the time to identify one of the major problems we have experienced in preparing this report because it goes to the heart of the transferable skills debate. There is no doubt whatsoever in our minds that attitudinal skills of the type mentioned above are a fundamental part of any set of transferable skills needed by all members of the workforce. However, in addition to Sjogren's question of whether such skills can be instilled, needs be added a further question–*should* they be instilled? Furthermore, assuming it can be done, should TAFE be the one to do it?

In discussing this issue, we are taking a very broad view of the term 'attitude'. And, while we are reasonably sure that certain qualities like punctuality and courtesy can be instilled, we are far less confident about other skills.

How for instance, do we teach students about the dilemma of honesty versus loyalty when it comes to describing an employer's product? And should TAFE be in the business of teaching people to be extroverted or unprejudiced? These are, of course, rhetorical questions and we will return to this issue in Chapter II on SKILLS CONTENT OF PROGRAMS FOR TRAINING AND WORK.

3.0 TRAINING PERSPECTIVES

In this section we will look at developments in training practices to see how they relate to the provision of transferable skills. Much of this will, of necessity, be addressed to apprenticeship training since this is the largest single form of TAFE training for the vocations.

Training issues for consideration are those associated with:

- trade teachers
- mobility and productivity
- competence
- labour market.

3.1 Training and trade teachers

Schilling (1983) in his report on common skills across trades in Australia had a particular concern for training issues. (His 'common skills' are closely parallel to transferable skills - see DEFINITIONS p.6.)

Among Schilling's findings is one with considerable bearing on this present study; namely:

> . . . many teachers are very antagonistic to a common skills approach, especially for part-time trade courses (p.8).

The reasons for this antagonism were not explored to any degree and it would have been interesting to know whether this was basically a response of a relatively conservative group of teachers toward changes that would effect the way they would have to teach.

Not surprisingly, many teachers react unfavourably to proposals that they change what they believe they are doing well. Therefore other proposals for changes in the way their teaching is organized are also likely to cause them concern. For example, Hunter (1984b) has suggested that teaching in the trades should more closely reflect the abilities of TAFE and industry to provide the skills needed by trainees. He proposes three modes of training:

Group A trades in which TAFE can provide both theory and workshop practical application of the theory on site, without the need for extensive training in an industrial situation. Examples would be trades such as hairdressing and cooking.

Group B trades in which TAFE can provide the theory but only limited workshop practical application, mainly because of rapid technological change. Examples would be trades such as sheetmetal work and automotive mechanics. The establishment of special industry skill training centres is seen as one way of providing adequate practical training for Group B trades.

Group C trades in which TAFE is seen as a facilitator of training rather than a provider because of the relatively small number of trainees involved and the highly specialised nature of the training required. An example would be training for the aircraft industry. TAFE's role in Group C trades would include arranging for as much training as possible to be done within the industry.

Under these three modes of training, the role of TAFE teachers varies from being the providers of both theory and practical work within TAFE to the facilitators of training which is largely outside TAFE.

The implications of such wide ranging changes for TAFE teachers are considerable and, given the warnings implicit in Shilling's findings, any move to change skills training in TAFE will require thorough planning and extensive staff development work.

3.2 Training for mobility and productivity

The need for occupational mobility among today's workers indicates that, aside from purely job-specific training, a broad education encouraging skills which facilitate transfer of training will be desirable.

The concept of transferable skills training raises issues such as whether we should be educating to meet the needs of employers or educating to develop the 'whole person'. The benefit of the transferable skills approach is that it is seen to be of use to individuals as well as to employers via the availability of a more adaptable and innovative workforce.

A range of modifications to apprentice training which address the issues of mobility and productivity have been suggested by Hunter (1984a) and could be useful for a large number of vocational programs. They are:

. to minimise the existing problems relating to initial selection of applicants;

- to ensure that each apprentice has a breadth and understanding of the fundamentals of mathematics, science, English and communication skills, which will permit recurrent training at a future date;

- to ensure that initial training is of a type which will provide skills which are common across a wide range of trades, thereby providing for flexibility and mobility. It should also enable the subsequent choice of a specific apprenticeship trade to be made on the basis of an informed decision, thereby minimising the potential for high wastage rates in subsequent training;

- to ensure that in addition to general and common skills training, there should be some specific skills training given prior to indentured apprenticeship to ensure that the apprentice is immediately productive on entering employment, thereby overcoming a current complaint of many employers which is that first year apprentices are unproductive. Such a measure would also give the apprentice a significant degree of self-confidence.

3.3 Training for competence

Hunter's suggestions for changes to trade training are some of many that have surfaced in recent years (Sandery, 1984, and Sandery & Skott, 1984, provide several other alternatives). In all these amount to a significant attack on the apprenticeship system.

Many people who are the products of, or supporters of, the traditional apprenticeship system have been saddened by the growing disenchantment with this form of training. The reasons for this disenchantment include:

- the reliance on a time-serving method to judge 'satisfactory completion' of a training program;

- the inability of employers to give apprentices the full range of experiences they need to be deemed proficient in the trade;

- the inflexibility of apprenticeship legislative requirements in such things as age restrictions, educational prerequisites, and terms and conditions.

Put bluntly, the apprenticeship system is regarded as failing because it is unable to cope with the demands of a rapidly changing society. However, it is one thing to identify a problem, but, quite another to produce solutions. Technical and vocational education with its mix of methods and purposes defies any easy answer to the problem of what should replace apprenticeship.

A significant requirement in any move away from the traditional form of apprenticeship will be the need to establish a simple system of certification, licensing or registration. The appropriateness of the standards established for this system will be of crucial importance as the community needs to have confidence in its tradespeople. It is this point that has generated an increasing interest in a training system based on the attainment of competencies.

A competency-based system of education and training in the trades involves the specification and demonstration of job-related skills. Competencies are carefully identified and subjected to verification by experts. The criteria for assessing each competency are also explicitly stated and made public. Students can then progress through the training program at their own pace with assessment taking place along the way.

The system differs from the traditional apprenticeship training in that progress is dependent upon the mastery of competencies along the way as well as at the end of the program. In a competency-based system, the incompetent trainee cannot be certificated whereas with the apprenticeship system this is possible, albeit unlikely.

It should be added, by way of defence of the apprenticeship system, that what is 'traditional apprentice training' is often more a function of people's perceptions than the reality. Apprenticeship is a system of vocational training which combines on-the-job training and work with part-time off-the-job training under a supervised contract of training. It is possible for this system to be highly flexible and there is evidence that the states and territories are moving in this direction, although changes seem to be coming more slowly at the Federal level. The point to appreciate is that the notion of training for competence does not conflict in any way with the principles of apprenticeship training.

3.4 Training and the labour market interaction

In Section 2 Current labour market issues we identified many factors which influence the what, when, where, why and how of skills training. One issue that emerges from a consideration of these factors is the way they affect TAFE training. The rules and regulations of the workplace and the shifts brought about by factors such as technological change all influence how TAFE trade courses are developed and taught. There are real constraints on the responses that trainers can make to meet changing skill requirements since many of the developments are beyond their control. This was noted in the recent report of the Australian Science and Technology Council (ASTEC 1983):

> The skill levels of a particular job, therefore, depend on the skill content of each task and how tasks are allocated between jobs and between people and machines. Whether particular jobs are destroyed, deskilled or upgraded, therefore, is likely to depend significantly on how tasks are combined.

Decisions such as these are usually made with little regard to the training required.

To handle labour market issues properly, it will be essential that any implementation of transferable skills training has the support of the four sectors; employers, unions, the industrial training authority and TAFE, at all stages from design to delivery.

Prescott (1986) has put the employers' view on their role in any cooperative endeavour to improve skills training. After making the point that TAFE needs to see industry as a consumer of training that should be wooed and satisfied and not treated as a captive user, he goes on to support a mechanism of consultation on an industry-by-industry basis involving the above four sectors.

The need for cooperation between the sectors was also noted by Kirby (1986) who stresses the importance of governments in the enterprise. Indeed, some of the changes he forsees involve industrial awards and job classifications that make government involvement mandatory.

CHAPTER II: SKILLS CONTENT OF PROGRAMS FOR TRAINING AND WORK

1.0 INTRODUCTION

Attempts to codify the skills which will enhance job mobility have played a major part in the development of the concept of 'transferable skills'. An exact listing of these skills for training purposes has been as much sought after as the holy grail! Using a variety of taxonomies, terminologies, skill classifications and task analyses, jobs have been 'dissected', 'analysed' and 'matrixed' in an attempt to achieve this end.

Our review of the literature revealed two distinct purposes for these analyses:

- to identify the skills a student will require to complete a course of training and/or retraining;

- to identify the skills needed during working life.

Overall, the major concerns of each of these purposes coincided to a remarkable degree: the only differences of note being in the terminology used in some studies. We found that occasionally the term 'communication' was used to cover literacy, oral communication and numeracy and that the term 'problem solving' was used variously to mean 'life skills', 'problem-solving methods' or to cover mathematical logic skills.

The fact that both the educators and employers involved in these analyses arrived at the same conclusions largely independently of each other, means that roughly the same set of skills is useful for success both off and on-the-job. This consistency of findings is particularly useful for vocational curriculum design. We will now look at these groups of skills more closely.

2.0 SKILLS NEEDED FOR TRAINING

Nelson (1986) surveyed directors of post-secondary trade and industrial technology, and industrial arts teacher education programs in the United States to discover what skills they rated as being the most important in enabling students to complete their programs. The data enabled him to list the 11 most important skills as being:

1 problem solving techniques (see note below);
2 effective working habits;
3 ability to use mathematics and science to solve technical problems;
4 written and oral communication;
5 ability to work effectively with others;
6 knowledge of problem-solving techniques;
7 responsibility;
8 safe working procedures;
9 interest in learning;
10 self-confidence and self-esteem;
11 understanding of the role and impact of technology in our world.

Note:

To be able to solve problems, (1) is different to that of the knowledge of the variety of processes or techniques involved (6).

In Nelson's 'knowledge' category the five most important areas identified were:

. problem-solving techniques;
. safe working procedures;
. human relation skills;
. written and oral communication techniques and skills used in industry;
. the role and impact of technology in our world.

Almost all of the 28 knowledge areas on his total list were rated as 'important' or 'very important'.

The top five priorities in his 'attitudes' category were:

. ability to work effectively with others;
. self-confidence and self-esteem;
. responsibility;
. interest in learning;
. honesty.

Next in order of importance were; an appreciation of work; and pride in work. All but one of the 10 attitudes on the list were termed 'very important' or 'important'.

It should be pointed out that Nelson's list of skills brings with it some difficulties in terms of our earlier definition of transferable skills. For example, 'safe working procedures' is defined as a knowledge skill, but, it is hard to see this as purely knowledge. Attitudes are known to play a large part in 'safe working procedures' and Nelson's work is equivocal on this and a number of other skills. However, that does not detract from the fact that he was able to identify certain important skills that educators believe are necessary for training and retraining.

Greenan (1983a) developed the G.S.I.Q. (Generalizable Skills Importance Questionnaire) to survey teachers and thereby determine which skills are generalizable within and across secondary level vocational programs in the United States. The skills were defined as those needed for successful performance in the programs and, by inference, successful performance in related post-secondary programs and employment.

The final selection of skills in the survey was reviewed by employers and workers and resulted in 115 separate skills divided into 4 skill areas as follows:

- mathematics (for example, whole number operations, fractions, percentages) - a total of 28 skills;

- communication (for example, the use of words, pronunciation, fluent speech, ability to read manuals) - a total of 27 skills;

- interpersonal relations (for example, ability to state a point of view, to follow instructions, to give a demonstration of a skill, to identify peoples' need for instruction) - a total of 20 skills;

- reasoning (for example, ability to identify potential problems, to set goals, to recall ideas.) - a total of 40 skills.

NOTE: Manipulative and occupational skills were excluded from the survey as Greenan felt that vocational education had a traditional emphasis on these areas to the detriment of others. The level of generalizability of the 115 skills was checked against five occupational groups:

- agricultural
- business
- health
- home economics
- industrial.

The results suggested to Greenan:

> . . . that the construct of generalizable skills existed and was capable of identifying the performance competencies that were common to various vocational programs. There may be a common core of generalizable skills that is necessary and important for success in many postsecondary vocational programs. Students may need to possess high proficiencies in the generalizable skill areas of mathematics, communications, interpersonal relations and reasoning, to succeed in such programs (p.33).

In the UK the Manpower Services Commission (MSC) set out certain core skills for guidance in the TVEI curriculum, covering 15 aims mainly concerned with change or life skills, communication, interpersonal and problem-solving skills. This is a broad ranging curriculum meant to occupy 50% of the 'in school' time: the remaining 50% being spent on occupationally specific skills. However, it is intended that these broad skills be taught in the context of at least one occupational category.

Also in the UK, the Further Education Unit (FEU, 1982) has produced a recommended set of content areas for a vocational preparation curriculum which include:

- decision-making skills;
- interpersonal relations;
- appreciation of physical skills;
- moral values;
- literacy and numeracy;
- study skills;
- planning skills;
- political and economic literacy;
- coping skills;
- attitude to change.

The City and Guilds of London Institute (CGLI, 1982) has also developed a vocational preparation curriculum which identifies a mix of transferable skills that are classified into four areas as follows:

- Social Abilities

  - working with colleagues
  - working with those in authority
  - self-awareness

. Communication

- talking and listening
- reading and writing
- visual understanding

. Practical and Numerical Abilities

- using equipment
- dexterity and coordination
- measuring
- calculating

. Decision-making abilities

- planning
- seeking information
- coping with problems
- evaluating results.

The attempts of educators to provide secondary vocational curriculum such as the above, with their mixture of general and occupational specific skills, has drawn strong criticism from some quarters. Violas (1982) has mounted a particularly persuasive attack in his review of the theoretical underpinning of secondary school vocational education. The deficiencies of secondary vocational education that he identifies relate to issues we have already considered in Chapter I, THE CONCEPT OF TRANSFERABLE SKILLS such as, unemployment, technological change and the skills gap between specialist and skilled worker. Violas argues:

> During so-called boom times nearly all workers find employment. Yet during economic stagnation we hear the judgment often expressed that unemployment is caused by a lack of skills among the unemployed and that the appropriate method to fix unemployment is to school the worker to develop vocational skills. It would appear that the 'problem' is not skills but the performance of the economy and the mechanisms of the labor market.
>
> If it is the case, as the preponderance of evidence suggests, that most of the work places for which vocational students are being prepared do not require significant amounts of skill, understanding of the technology involved in the production process, nor innovation on the part of the worker, then specific cognitive and manual skills training seems, at best, superfluous. Especially if requisite skills can be quickly acquired on the job, then it seems clear that the 'investment' both by the state and the student in curricula to develop such skills may be wasted (p.148).

Violas's review is directed at the secondary vocational curriculum, so it is of limited relevance to TAFE. However, as will be seen, there are close similarities between the needs for training and the needs for working life so, we believe his criticisms cannot be totally disregarded.

3.0 SKILLS NEEDED DURING WORKING LIFE

Information regarding the need for transferable skills during working life is wide ranging. It varies from general statements such as that in the OECD draft report on Competencies Needed in Working Life (Stevenson, 1980) (which does not relate the skills in any manner to particular occupations, but assumes that all workers will need the basics of the competencies listed), to detailed analyses of occupations and the specific nature of the skills useful in a work situation.

The OECD listing identified the following competencies:

. Abilities and Techniques

- reasoning
- learning
- reading
- writing
- calculating
- manipulating
- elementary technology

. Personal and Social Skills

- social skills
- work values
- communicating:

    . speaking;
    . knowledge of other languages;
    . non-verbal communication;
    . symbols.

. Knowledge About Working Life

- the world of work
- finding a job
- survival and development in employment.

Martin & Fountain (1982), constructed a chart to assist individuals in career selection, and in so doing they matched 16 occupational factors (categorised under job requirements, work environment and occupational characteristics) with over 250 occupations chosen from the 1982-3 Occupational Outlook Handbook.

1 Leadership/persuasion 2 Helping/instructing others 3 Problem-solving/creativity 4 Initiative 5 Work as part of a team 6 Frequent public contacts 7 Manual dexterity 8 Physical stamina	JOB REQUIREMENTS
9 Hazardous 10 Outdoors 11 Confined	WORK ENVIRONMENT
12 Job concentrated geographically 13 Part-time 14 Earnings 15 Employment growth 16 Entry requirements	OCCUPATIONAL CHARACTERISTICS

Further to this, 68% of all jobs they identified which required manual dexterity also listed problem-solving and/or initiative as job requirements.

Kawula and Smith (1975) as part of the Canadian study referred to at the beginning of Chapter I, undertook to identify generic skills which were transferable across many occupations. They used the DOT (Dictionary of Occupational Titles) classification and a Data, People and Things taxonomy, the results of which suggested that the skills mainly considered transferable were in the areas of mathematics, reasoning, communicating and interpersonal relations.

Wiant (1977) studied the attitudinal skills required across occupations that were identified at a series of nine conferences held with employers to produce a composite list of transferable skills. The conference participants generally concluded that attitudinal qualities and interpersonal skills should be given greater recognition at all levels. Wiant's list of transferable skills is provided in Table 1. Items are listed in approximate order of frequency within each category.

The rankings indicated by Table 1 can only be a rough estimate of a 'true' order, however, a number of the items were mentioned with notable frequency. In rank order, these were:

TABLE 1
COMPOSITE LIST OF TRANSFERABLE SKILLS IDENTIFIED BY CONFERENCE PARTICIPANTS

INTELLECTUAL/ATTITUDINAL

Communicating
Problem solving
Analysing/Assessing
Planning/Layout
Organisin
Decision making
Creativity/Imagination/Innovation
Managing one's own time
Basic computation
Logical thinking
Evaluating
Ability to relate common knowledge or transfer experiences
Coping with the labor market and job movement
Understanding others
Synthesizing
Marshalling available resources
Accommodating multiple demands
Judgment
Foresight
Trouble shooting
Job awareness
Mechanical aptitude
Typing
Accounting
Implementing
Self-understanding human system interactions
Organizational savvy
Conceptualisation
Generalization
Goal setting
Controlling
Quantitative thinking
Dealing with work situations
Finance
Tool usage
Bookkeeping
Artistic ability
Business sense
Tolerance of ambiguity

INTERPERSONAL

Working with, getting along with or relating to others
Managing, directing or Supervising
Teaching, training or instructing
Counselling
Motivating
Helping or co-operating
Cultivating co-operating
Selling
Accepting supervision
Delegating
Instilling confidence
Team building

ATTITUDINAL

Diligence or a positive attitude toward the value of work
Responsibility
Willingness to learn
Ambition/motivation
Self-confidence
Self-discipline
Pride
Enthusiasm
Patience
Self-actualisation
Assertiveness
Honesty
Loyalty
Reliability
Risk-taking
Compromising
Kindness

- Communicating
- Working with others
- Problem solving
- Analyzing/assessing
- Planning/layout
- Organising
- Managing others
- Decision making
- Positive work attitude.

In Wiant's view, the:

> . . . "intellectual/attitudinal" dimension contains items that are probably most commonly referred to as skills. These are items for which most persons have some innate aptitude, and for which training is at least implicitly provided in many courses of study. The "interpersonal" grouping also contains items recognized as skills amenable to training, though perhaps to a lesser degree than those of the first set. Another characteristic common to these two groups of items is that they tend to be readily expressible in gerundal form, that is, in terms of actions. By contrast, the "Attitudinal" category contains personal characteristics that appear to be least like skills and perhaps the least capable of being influenced by training (p.11).

(We believe this last point is very important and it is taken up again when we later consider the work of Sjogren.)

Selz (1980) in an investigation into what she termed 'employability' skills emphasized the life skills needs for trainees and workers.

Daniels (1984) has classified the transferable skills which optimize employability into three categories which relate the knowledge, attitudinal and life skills components in the following way:

1 Generalizable skills - those actively used in work performance; examples include mathematics, reasoning, communication (written and oral), interpersonal and attitudinal skills.

2 Problem-solving skills - employed in the resolution of problematic solutions; including personal problems (group and individual), information related problems and problems related to the understanding of human behaviour.

3 Transition skills - used to manage life transitions especially attitudinally related ones; including managing stress and making decisions.

Because we have taken a broad definition for the term 'skill' as being any learned behaviour, we have been able to avoid some of the difficulties of categorization that seems to have plagued other authors. Virtually all of the items on previous lists could be made to fall into one of our three groups of knowledge skill, attitudinal skill or manual skill. However, we do concede that there are problems in this approach. One is the difficulty we have with the English language because some words mean different things to different people. We have already made this point with the term 'communicating' which can be given a broad or narrow meaning. Another is a skill such as 'working with others' which, depending on one's point of view, can mean anything from 'performing effectively as part of a team' to 'displaying warmth and friendliness'.

The type of research which generated the lists and categories quoted above tends to have a substantial subjective element because of the variety of understandings of what words mean.

Our definition of skill also leads us into muddy water in the area of attitudinal skills. Part of the problem stems from two related words 'values' and 'personality'. We have asked ourselves, are there distinct behaviours that can be classified as attitudes, values and personality characteristics? Wiant's table, for instance, contains elements that some would want to divide into different categories; for example:

willingness to learn	=	an attitude
kindness	=	a value
patience	=	a personality characteristic.

We would concede that these categories can be challenged, but will now extend the question to raise what we believe is a more contentious issue, namely:

can these attitudinal skills be trained for or taught;

who should do the training or teaching?

We have already drawn attention to Wiant's belief that some skills do not lend themselves to training. Sjogren (1977), in his review of the literature, comes to a similar view.

Sjogren reviewed occupationally-transferable skills and concluded that 5 main areas existed:

- mathematics
- communication
- interpersonal
- reasoning
- manipulative/psychomotor.

These skills he saw as transferable to varying degrees across a range of occupations, although he stressed that any training in them needed to emphasize a knowledge of processes and, most importantly, a knowledge of the content and context for application.

This last point he applied to training in attitudinal skills:

> The problem, however, is that school situations are probably not appropriate for this kind of training. Personality characteristics are quite enduring and stable. Change usually requires a long-term, clinically oriented program. Attitudes are more amenable to change, but even for these the settings needs to be appropriate. Few people change their attitudes by being told to do so, a practice that schools use over and over without much success (p.25).

Writing about attitudes and values is of itself a value-laden activity. And, even when putting the alternative points of view it is virtually impossible to avoid one's own values emerging.

Bloom, Madaus & Hastings (1981) have reviewed the reasons why authors such as Wiant and Sjogren have reservations about the teaching of attitudinal skills. In summary they are that such teaching can:

- lead to indoctrination and brainwashing;
- take away the rights of the family and religion to teach these skills in the way they want them taught;
- be an invasion of privacy.

Although Bloom and his colleagues argue persuasively that attitudinal skills can (and should) be taught, they do identify a number of caveats that present a challenge to even the most competent teacher. For example, they advocate 'techniques that assure anonimity and privacy' in the collection of information about attitudinal objectives (p.300).

4.0 A BASIC PACKAGE OF TRANSFERABLE SKILLS FOR TAFE

The criticisms of Violas referred to earlier in regard to secondary vocational education are most damning and, as far as we can discern, they have remained unanswered by educators. They challenge the validity of much of the work reviewed in the first half of this chapter.

The supporters of vocational secondary schools in the US and programs such as TVEI and similar vocational programs in the UK clearly need to address the issues raised by Violas. However, because this paper is looking at the possible roles for TAFE in transferable skills training many of Violas's criticisms do not apply. TAFE students are already set on some career training path so TAFE skills training has a context which most secondary school programs lack.

It is interesting to note, although as an aside to this paper, that the rekindled interest of the secondary school system in a 'technical education curriculum' has the potential to destroy a reputation or two among those who tackle the task as though it were simply just another curriculum development exercise.

The remarkable overlap between 'Skills needed for training' and 'Skills needed during working life' is no doubt more than a coincidence. But the reasons need not concern us at this time. It is enough to appreciate that there is a reasonable level of agreement about a set of skills needed for working life.

Skills that are transferable across occupations range from simple communications skills (which include literacy and numeracy) to more complex interpersonal skills which are variously required for survival in the world of work. Furthermore, survival in the world of work is increasingly demanding an understanding of technology and how to deal with technological change. These transferable skills break down into the two groups we identified in Chapter I; namely:

- broad based skills (often called 'life skills') such as basic literacy, numeracy and an understanding of the world of work, which are transferable across many jobs;

- occupationally specific skills which are of relevance to a cluster of similar jobs such as oxy-acetylene welding in the metal and construction trades.

However, it should be stressed that we have serious reservations about attempts to teach some of the attitudinal skills that are often found in the life skills categories. Teaching which attempts to change values or personalities is not appropriate to TAFE.

Each of our categories contain skills that are transferable within a group of occupations to varying degrees of specificity. How this can be done is considered in the next chapter.

CHAPTER III: STRATEGIES FOR IMPLEMENTATION

1.0 CURRICULUM DELIVERY METHODS

Part of our brief for this report was to discuss ways in which transferable skills could be integrated into existing vocational curriculum. However, before this can be done, a broader consideration of some curriculum delivery methods is necessary.

We will consider three methods that are of relevance to the delivery of transferable skills:

- competency-based delivery;
- individualized instruction;
- modular instruction.

1.1 Competency-based delivery

Competency-based programs have already been considered in the section in Chapter I on Training Perspectives.

The essential and desirable characteristics of competency-based programs are summarized in Table 2.

It can be argued that there is little here that does not fit with the traditional apprenticeship system. Both systems seek to achieve the same end in the form of a highly-skilled workforce. Indeed, it would be relatively straightforward (in a legislative sense) to incorporate a competency-based approach into the apprenticeship system. Australian TAFE colleges are increasingly moving towards the use of a competency-based approach to apprentice training. By marrying the completion of indentures to the achievement of a defined set of competencies, rather than an elapsed period of time, a new delivery system could be created. Although possibly requiring minor legislative changes governing apprentices, this action would ensure graduates of the system were competent to specified standards in their vocations. The ITC of Victoria in its report on the adequacy of the apprenticeship system in 1980 also observed that the introduction of these new training methods had stimulated industry involvement in examining syllabuses and training generally.

TABLE 2
ESSENTIAL AND DESIRABLE CHARACTERISTICS OF COMPETENCY-BASED VOCATIONAL EDUCATION PROGRAMS

A. ESSENTIAL CHARACTERISTICS

1. Competencies to be achieved by the students have been:
   a) carefully identified
   b) verified by local experts
   c) made public.

2. Criteria for assessing each of the verified competencies have been:
   a) derived from analysis of the competencies
   b) explicitly stated along with conditions
   c) made public.

3. Instructional program provides for the:
   a) individual development of each competency
   b) individual assessment of each competency.

4. Assessment of the students' competency:
   a) takes knowledge into account
   b) takes attitudes into account
   c) requires actual performance of the competency as the major source of evidence.

5. Students progress through the program:
   a) at their own rate
   b) by demonstrating their competence.

B. DESIRABLE CHARACTERISTICS

6. Instruction is individualized to the maximum extent possible.

7. Learning experiences are guided by frequent feedback.

8. Emphasis is upon students' achievement of exit requirements.

9. Instruction is individually-paced rather than time-based.

10. Instruction is field-centred using realistic work situations and actual on-the-job experiences.

11. Instructional materials are:
   a) modularized
   b) mediated
   c) flexible with both required and optional learning activities provided.

12. The instructional program as a whole is carefully planned and systematic evaluation data are used for program improvement.

(Table after Norton 1980)

1.2 Individualized instruction

Part of the reaction to the perceived lack of flexibility that is associated with traditional apprenticeship training has been the growing interest in individualized instruction. To some, a major appeal of individualized instruction is that it approximates the one-to-one master-apprentice relationship of the traditional trade training system. The 'master', however, is usually in the form of a printed text or a television monitor screen. Flesh and blood 'masters' in the form of teachers have a role (often an important role) in most individualized instruction systems. However, in such systems, the time required of teachers in routine one-to-one contact is very limited. The use of individualized instruction puts the teachers in the role of learning managers and enables them to deal with individual student problems as necessary.

By individualizing instruction, one of the important conditions of competency-based delivery is advanced, namely that of the students progressing at their own rates (see Desirable Characteristics 6 and 9 in Table 2). Programs for achieving this have been around for a long time. The programmed learning texts initially developed in the 1960s were an early version. More recently, variations involving the use of new technologies such as video-tapes, audio-tapes and computers have come onto the market. Most individualized systems of instruction involve:

. small steps in learning which follow a clear sequence;

. a requirement of mastery at every step;

. immediate feedback at every step.

One important consequence of the mastery requirement along with the immediate feedback is that students can regularly experience success. This, it is claimed, enhances their self-concept and produces a situation in which 'success breeds success'. Some students come to trade courses with a poor self-image, having experienced failure in their primary and/or secondary education and therefore having a negative attitude towards the education system. The method of small steps–mastery–feedback will often produce a complete turnaround in the attitudes and performance of such students.

A further consequence, and one which has wider ramifications for curriculum delivery structures, is that individualized progression means some students complete their training well within the 'allowed' time. The implications of this for apprenticeship training are considerable. As Murphy (1986) has pointed out, it can be argued that the lengthy period of most apprenticeships (four years) is there to:

> . . . ensure the newly trained worker stays with his initial employer to enable the employer to gain some return. In other words, the apprenticeship can be seen as being artificially lengthened to prevent other employers from 'poaching' the newly trained worker until such time as the individual is regarded as having paid his initial employer for his training (p.18).

The counter argument is of course, that the period of four years is necessary in order to gain sufficient on-the-job training and this alternative point of view needs further consideration.

Time to complete a period of instruction is therefore a most important element to consider when designing any delivery system for the trades.

1.3 Modular Instruction

A consequence of the demand for a more individualized approach to trade training is the requirement that learning materials be presented in a way that reflects this different approach. One way that this is accomplished is through the use of small, self-contained packages called modules.

The features of the modular approach to training are:

- modules can be used with large or small groups as well as individuals;
- individual modules can focus on one, or a small number of important competencies;
- courses can be designed in ways that enable students to follow individual programs based on their needs;
- modules dealing with specific local content are very easy to introduce into more broadly-based programs;
- each module culminates in an assessment of the learning that has taken place, thus providing immediate feedback and motivation to the learner.

Modular training has been implemented in a number of trades to encourage individual progression of students through the course and has been recommended by Mill (1984) as a system upon which accredited lifelong skill development could be built, through facilitation of multi-entry and multi-exit points for students and trainees. Mill also argues that a modular structure will facilitate the development of new courses and the updating of existing courses - he believes that it is the applications of skills which change rather than the types of skills required.

McDonald (1982) has reviewed a number of uses of modules in trade training and has shown that, while there is strong evidence of their effectiveness, their introduction needs to be well planned. Most important among the issues that need to be taken into account is the requirement that teachers need to be trained in the use of modular instruction. The teachers need to know how to deal with a situation in which different students are working on different modules. This is particularly true in workshops where a wide range of practical work may be going on at the same time.

Likewise, students need preparation for this method of learning. Students have much greater control over the amount they learn and their pace of learning when using modular materials. Teachers have an essential role to play in making sure that students understand how to use modules and do not feel they have been left to fend for themselves.

2.0 CURRICULUM DEVELOPMENT FOR TRANSFERABLE SKILLS

In this report, we chose to consider delivery methods before curriculum development because the knowledge of how transferable skills can be delivered provides an essential context for what is to follow. In practice of course, the curriculum development process comes first.

The curriculum development method that seems most appropriate for transferable skills focuses on what is to be taught rather than how it is taught. Indeed, in its purest form, the method draws its content solely from industry experts without the involvement of teachers. The method is DACUM (Develop A CurriculUM).

The DACUM method consists of a number of clear steps carried out by a group of experienced trade practitioners as follows:

. a general review of the trade area;

. identification of general areas in which competence is required;

. identification of the specific skills for a chosen group of duties;

. identification of the specific skills for further groups of duties following the pattern established for the first group;

. review and refinement of the analysis;

. decision on the appropriate sequence for the skills;

. establishment of appropriate levels of competence for each skill in terms of difficulty, frequency and general importance to the trade area;

. final construction of an array of sequenced competencies.

One problem with DACUM is that the process is not geared to dealing with the way in which an occupation might be changing. Because changes are very real issues when it comes to transferable skills, it will be important to add a concluding stage to the DACUM process which has the participants 'identifying future trends'.

Furthermore, it may be necessary to build an earlier stage into this method to cope with those occupations where change is ongoing. This would necessitate beginning the process with a Search Conference (Anderson and Jones, 1986) which brings together the major stakeholders in the curriculum development exercise; namely, representatives of the relevant employers, unions and industrial training commission committees plus TAFE teaching staff and possibly students. Because of the representation of stakeholders in the conference and their involvement in the research and action planning stages, the prospect of implementing the eventual curriculum outcomes is improved.

The Search Conference would then lead straight into the DACUM.

Whether or not the addition of a Search Conference is a necessary condition will need to be decided on an individual curriculum basis.

Central to the acceptability of the method is the fact that the array of competencies is developed by experienced industry practitioners. They are therefore likely to be accurate in assessing the appropriateness of levels of competence, and they must also live with the products of the curriculum. It is the current custom to assist the practitioners by using a formal, relatively structured, system for developing the array, led by a person experienced in this method of curriculum development.

When the set of competencies has been developed, the structuring of the processes by which students will learn (which may in fact already have had some influence) can take place in accordance with the general philosophy of the training authority. This also takes into account the various constraints—especially economic and geographic—which are known to exist.

3.0 A TEACHING BASED STRATEGY

The method proposed for developing the curriculum for transferable skills is one in which the TAFE teacher does not normally have a formal role. However, it should be pointed out that Anderson and Jones (1986) note some Australian versions of DACUM do include teachers in the process and, given the special importance of teaching techniques when delivering transferable skills, we believe that teacher participation in a Transferable Skills DACUM should be mandatory.

Teacher input will also be important when organising the sequencing of the teaching program because here too we are recommending a departure from the conventional approach.

Mealyea's (1986) research has indicated that while many apprentices experienced reading problems during the course of their training, 'back to basics' remedial work was not the solution. He noted that the

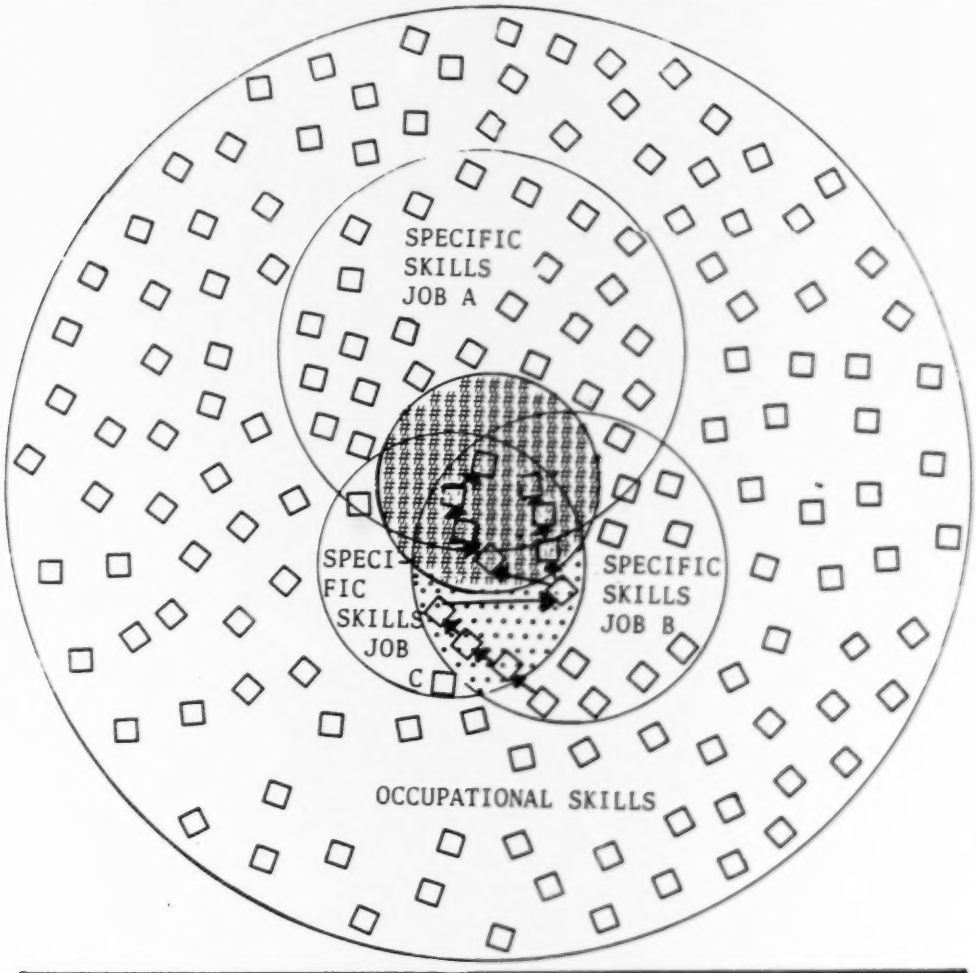
> . . . audience for which technical prose is intended is typically a specialized audience with specific interests, needs, motivations and background experiences that relate to a particular art, profession or domain of knowledge.

Therefore he recommended that students receive:

> . . . some prior knowledge or experience of the topic before they read the texts, modules, teacher handouts or systems instructions . . . and the best person to assist apprentices in gaining prior knowledge is the trade teacher . . . who can breathe meaning into that (to the novice) awfully difficult print . . .

We believe work of this nature is supportive of our proposal for a strategy which starts with skills from the specialized parts of the curriculum then moves to the occupationally-specific transferable skills then to the basic transferable skills. The strategy is shown in the diagram.

A STRATEGY FOR DEVELOPING A TRANSFERABLE SKILLS MODULE



EXPLANATION OF DIAGRAM

1. Each □ represents a skill.

2. The outer circle is the 'universe' of possible skills for all occupations.

3. The inner circle ## is the set of basic transferable skills - many of these are common to a large number of occupations.

4. The :: overlap is a set of occupationally-specific transferable skills for jobs B & C (that is, those skills common to the family of occupations B + C).

5. The arrows → show one possible sequencing of a transferable skill module for a student training for job B.

   - start with a specific skill
   - move to occupationally-specific skills
   - then to basic transferable skills.

CHAPTER IV: CONCLUSIONS

Our research has shown that there are major difficulties facing this country if we do not work to improve our skills training across a broad front.

Labour market issues have been shown to be of significant importance when determining a skills curriculum for the workforce. These issues can have both direct and indirect effects on skills training. At times, decisions regarding responses to technological changes such as job specialization and demarcation first need to be made by employers and unions before TAFE can effectively mount the appropriate training programs.

The development of programs to deliver transferable skills requires the involvement and support of employers, unions, industrial training authorities and TAFE at all stages from design to delivery. The level of involvement and support needed from each of these groups should not be underestimated. Co-ordination of the development would be well placed with the state and federal governments, particularly since changes to awards and job classifications will be required. Although it is the employers and unions who are dominant in determining awards and job classifications, any changes to the existing training system are likely to have cost implications. Governments must therefore be prepared to take the lead in making the financial decisions required for funding any new training programs.

Adequate staff development is seen as a vital ingredient of the resource package. Much of the training for skills in Australia has its roots in a system with a long and proud tradition. To change that system without adequately preparing the existing workforce of trainers and teachers could prove to be a recipe for disaster.

A strategy for instilling transferable skills into vocational curricula is proposed. It requires:

- a competency-based approach;
- the use of individual progression;
- the use of modular instructional materials;
- sequencing in a way which starts with skills from the specialized parts of the curriculum then moves to the occupationally-specific transferable skills then to the basic transferable skills.

The strategy addresses a small but significant part of the overall problem of skills formation. The next stage, to begin in 1987, is to conduct a pilot study which involves integrating transferable skills into an existing vocational curriculum.

REFERENCES

Anderson, T., & Jones, N. (1986). TAFE curriculum research: a review of group process methods. Adelaide: TAFE National Centre for Research and Development.

ASTEC. (1983). Technological change and employment: a report to the Prime Minister by the Australian Science & Technology Council. Canberra: Australian Science & Technology Council, Technological Change Committee.

Bloom, B. S., Madaus, G. F., & Hastings, J. T. (1981). Evaluation to improve learning. New York: McGraw Hill.

CGLI (City and Guilds of London Institute) (1982). In J. Hills, Profiles in Training. Profiles London: Further Education Unit.

Coopers & Lybrand, W. D. Scott. (1986). Interpersonal skills as a critical component in customer service. Canberra: AGPS, National Training Council, Training Development Series.

Daniels, M. H. (1984). The Development of a model, strategies and procedures for introducing change skills into vocational programs. Carbondale: Southern Illinois University, College of Education.

EEC (1983) Council Resolution on Vocational Training Policies in the Community in the 1980's. Adopted by the joint EEC Council of Social Affairs and Education Ministers. European Industrial Relations Review.

Employment and Immigration Canada. (1979). Generic skills: secondary school vocational model for craft trades.

FEU (Further Education Unit). (1982). Basic skills. London: Further Education Unit.

Ford, G. W. (1984). Australia at risk: an underskilled and vulnerable society. In Labor Essays. Blackburn, Vic.: Dove Communications.

Fraser, D. (1983). Skills training for school leavers: some alternative approaches. Canberra: Australian Department. of the Parliamentary Library, Canberra Legislative Research Service.

Freeland, J. (1985). Educational Credentials: the Need for Re-appraisal. Curriculum Exchange No. 3.

Greenan, J. P. (1982). The development of generalizable skills instruments for identifying the functional learning abilities of students in vocational education programs. Journal of Industrial Teacher Education, 19, 4.

Greenan, J. P. (1983a). Identification and validation of generalizable skills in vocational programs. Journal of Vocational Education Research. 8,3.

Greenan, J. P. (1983b). Identification of generalizable skills in secondary vocational programs. (Summary report) Illinois: Illinois University Urbana, Department of Vocational and Technical Education.

Hayes, F. C. (1981). Occupational training families. IMS Report No. 34. University of Sussex, Brighton: Institute of Manpower Studies.

Hayes, M. (1986). Report of a workshop on skill formation (Interim). Canberra: Australian Council for Employment and Training.

Holland, G. (1982). Response to a changing world. Industrial Society.

Hunter, I. (1984a). In C. Sandery (Ed). Perspectives on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Hunter, I. (1984b). Supporting notes for a proposed model of skills training. In C Sandery, & D Skott, (Eds). Conferences on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Industrial Training Commission of Victoria. (1980). Report in respect of the commission's review of the adequacy of the apprenticeship system as a means of training skilled tradesmen. Melbourne: Education Department.

Jones, B. (1986). Teaching basic skills for the information age. Unicorn, 12,2.

Kawula, W. J., & Smith, A. De. W. (1975). Generic skills: handbook of occupational information. Canada: Department of Manpower Training and Immigration.

Kirby, P. (1985). Report of the committee of inquiry into labour market programs. Canberra: AGPS.

Kirby, P. (1986). The passing of a Golden Age, In Future, December 3.

McDonald, T. (1982). Modules: Self-paced learning, mastery learning, competency profiling. Perth: Western Australia Department of Education, Technical Education Division.

Martin, G. M., & Fountain, M. C. (1982). Matching yourself with the world of work. Occupational outlook quarterly. Winter 26, 4.

Mealyea, R. (1986). Reading: the role of the trade teacher. In Making messages, making meaning. Carlton: Australian Reading Association.

Mill, G., (1984). In C Sandery (Ed). Perspectives on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Murphy, T. (1986). Economic influences on skill acquisition by individuals. Draft Workshop Paper: Bureau of Labour Market Research.

Nelson, O. (1986). Competencies taught in industrial arts. Vocational Educational Journal.

Norton, R. E. (1980). Develop and implement a competency-based education program. Module CBE-1. Columbus, Ohio: Ohio State University Press.

OECD (Organization for Economic Co-operation and Development). (1983). Future of vocational education and training.

Pead, A. D. (1982). Apprenticeship for the manufacturing industry: developing a strategy for the future. Doncaster: Allan Pead.

Phelan, E., (1984). In C Sandery, (Ed). Perspectives on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Pratzner, F. C. (1978). Occupational adaptability and transferable skills. Columbus, Ohio: Ohio State University, National Center for Research in Vocational Education.

Prescott, T. (1986). The TAFE/industry interface. Australian Journal of TAFE Research and Development, 2,1.

Ritchie, J. B. (1984). Is Australia's skills base adequate? Training Talkback, February 19.

Sandery, C. (Ed). (1984). Perspectives on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Sandery, C., & Skott, D. (Eds). (1984). Conferences on the future of trade education. Adelaide: TAFE National Centre for Research and Development.

Selz, N. (1980). The teaching of employability skills: who's responsible. Columbus Ohio: Ohio State University, National Center for Research in Vocational Education.

Schilling, R. (1983). Common skills across trades. Adelaide: TAFE National Centre for Research and Development.

SCRE (Scottish Council for Research in Education). (1977). Pupils in Profile. Publication No.67. Edinburgh: SCRE.

Sjogren, D. (1977). Occupationally transferable skills and characteristics: review of the literature and research. Columbus, Ohio: Ohio State University, National Center for Research in Vocational Education.

Stern, B. (1977). Toward a federal policy on education and work. Washington DC: US Department of Health, Education and Welfare.

Stevenson, J. C. (1980). Report to the Director General of Education on the study of methods used to design courses leading to skilled occupations in Germany, France, England, USA, and Canada. Queensland: Department of Education.

Thorogood, R. F. (1985). Employment generation and training support arrangements in youth policy development. WA: WA Department of Education.

Violas, P. C. (1982). Reflections on theories of human capital, skills training, and vocational education. Education Theory. 31,2.

Watkins, P. (1986). Forecasting the technological future: directions for education. Unicorn, 12,2.

Weatherly, M. (1983). The Youth Training Scheme (UK): a review of plans and validation. Journal of Education Information Technology. 7,6.

Weber, J. M., & Silvani-Lacy, C. (1983). Building basic skills: the dropout. Research and Development Series No. 236. Columbus, Ohio: Ohio State University, National Center for Research in Vocational Education.

Wiant, A. (1970). Occupational change and transferable skills. Columbus, Ohio: Ohio State University, National Center for Research in Vocational Education.

Wiant, A. (1977). Transferable skills: the employers' viewpoint. Columbus, Ohio: Ohio State University, National Center for Research in Vocational Education.